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A NEW TRICOLOR *LEPTOTYPHLOPS* (REPTILIA: SERPENTES) FROM PERU

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Two Peruvian species of *Leptotyphlops* possess color patterns of red, yellowish white, and black. *L. rubrolineatus* (Werner, 1901:6) has a body pattern of alternating red and black longitudinal stripes; yellow pigment is confined to the rostrum, chin and throat, and tail. *L. teaguei* (Orejas-Miranda, 1964:4) has a body pattern of red, black, and yellow longitudinal stripes. Black stripes predominate with a thin middorsal black stripe flanked on each side by an equally thin black stripe. These three stripes lie on a red field bordered by dorsolateral black stripes and yellow lateral stripes; ventrolaterally and ventrally the body is black. Recently one of us (B.O-M.) discovered in the Museo de Historia Natural "Javier Prado" (MHNJP) three *Leptotyphlops* specimens with a tricolor pattern similar to that of *L. teaguei.* Scutellation differences indicate that these specimens represent a distinct species.

Leptotyphlops tricolor, new species

Holotype: MHNJP 0669, Peru: Ancash Department, Huaylas Province, Huaylas District: Yunca Pampa, (2700 m), collected by Acacio Ramos on 24 February 1966.

Paratypes: MHNJP 0670 and USNM 195853, same data as holotype.

Diagnosis: A *Leptotyphlops* of the *tesselatus* species group (Orejas-Miranda, 1964:4) characterized by broad contact between supraoculars and first pair of labials, differing from other members of the group except *L. teaguei* by its tricolor pattern of brick red, black, and cream longitudinal stripes, and differing from *L. teaguei* by absence of three narrow middorsal black stripes, presence of a cream colored mental region bisected by black stripe, and a higher number of dorsal scales (more than 300).

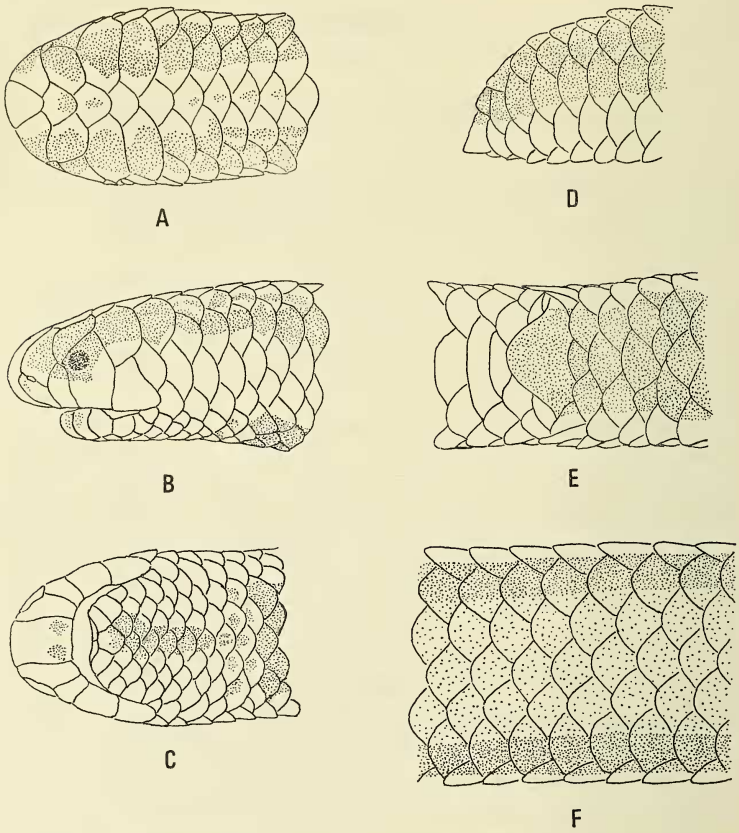

Fig. 1. *Leptotyphlops tricolor* (MHNJP 0669). A, B, C, dorsal, lateral, and ventral views of head, respectively; D, lateral view of tail; E, ventral view of cloacal region; F, dorsal view at midbody. Heavy stippling, black; light stippling, brick red; no stippling, cream white.

Description of the holotype: An adult male with total length of 295 mm and tail length of 14 mm; total body length/midbody diameter 60; head slightly depressed with snout projecting a third of entire head length beyond lower jaw; body subcylindrical, slightly tapered cranially and caudally; tail tip with spine mucronate. Body tricolor, a broad, dorsal, red stripe, a pair of narrow dorsolateral black stripes, a pair of lateral cream stripes, and a black venter (Figure 1).

Rostral triangular, dorsal apex not extending to transverse line between anterior border of eyes; nasal completely divided with naris in center of suture, supranasal longer than infranasal (approximately two times);

supralabial border formed by rostral, infranasal, anterior labial, ocular and posterior labial; rostral, ocular and posterior labial of subequal width at supralabial border; infranasal and anterior labial subequal, their width at least half that of former three scales; anterior labial single, two and a half times as high as wide, in contact dorsally at level of eye with supraocular; ocular one and a half times as high as wide; eye at level of maximum width of ocular and in anterodorsal half of ocular without reaching nasal border; posterior labial trapezoidal, widest at supralabial border; prefrontal, frontal, interparietal and interoccipital subequal and slightly smaller than more posterior middorsal scales; large supranasal and supraocular subequal and three quarters the size of the subequal parietal and occipital; eye in contact with supraocular-ocular suture; mental followed by four sublabials on each side; first pair of sublabials separated by a postmental.

Middorsal scales 303 plus rostal and caudal spine; body covered with 14 scale rows, reducing to 12 rows at anal plate and to 10 rows at the level of third subcaudals; anal plate enlarged and triangular with apex free posteriorly, anteriorly bordered by five rows of scales; 19 subcaudal scales.

Color pattern in alcohol: The body pattern consists of six longitudinal stripes. The middorsal brick red stripe occupies four scale rows, the middle three rows and half of each the two adjacent scale rows. The dorsolateral black stripes cover the halves of each scale on two adjacent rows. The lateral cream stripes lie on half of one scale row and entirely on the next adjacent ventral row. The ventral black stripe covers the five ventralmost scale rows.

The stripes lose their regularity on the head and tail. The wide ventral stripe ends abruptly on the neck; the throat has a few black spots, and a narrow black stripe extends from these spots to the mental. The mental is cream, although the dorsal halves of the first two pairs of sublabials are black. The dorsolateral stripes gradually angle dorsally as they approach the head, so that by the tenth scale row they lie over a single scale row rather than two halves. Also at this level, the dorsolateral stripe begins to widen medially, first as a few scattered black spots and cranially as solid black scales. On the head, this dorsolateral black stripe covers most of the occipital, parietal, and supraocular scales, dips ventrally onto the ocular to enclose the eye, and extends anteriorly across the dorsal tip of anterior supralabial onto the ventral half of the supranasal. The cream-colored rostral is immaculate except for a faint black mustache at the labial border. The prefrontal and frontal bear medial smudgelike black spots. The dorsal stripe begins to change from cream to red at the fifth middorsal scale, and the change is complete by the tenth middorsal scale.

Caudally, the ventral black stripe ends abruptly on the enlarged preanal scale; thus the ventral half of the tail including the caudal spine is cream colored. The dorsolateral black stripes converge and fuse dorsally above the spine. Black pigment has invaded the dorsal red

FIG. 2. Distribution of *Leptotyphlops tenellus*.

stripe to produce three faint black stripes that fade out as they approach the base of the tail.

Variation: Both paratypes are smaller than the holotype, a total length of 269 mm and 222 mm, tail length of 12 mm and 11 mm for the MHNJP and USNM specimens, respectively. The midbody diameter into total body length is 89 and 71, respectively. They possess 302 and 310 middorsal scales plus rostral and spine, and 18 and 21 subcaudals, respectively. The number of scale rows around body and tail is the same for all three specimens. Similarly the shape, position, and number of head scales is constant for all specimens. The only deviation occurs in the USNM specimen in which the postmental is enlarged to the right so that the second sublabial touches it.

The color patterns of the paratypes are similar to that of the holotype; differences are discernible only by close examination. The MHNJP specimen was preparing to shed when it was preserved, so color brightness is dulled; however the three narrow black stripes in the middorsal red field appear more prominently on the tail than on the body and also appear for a short distance in the neck region. On both of the paratypes the black pigment of the venter extends across the vent as a midventral stripe on the first one or two subcaudals. The black chin and throat stripe are continuous with the ventral body stripe and tend to

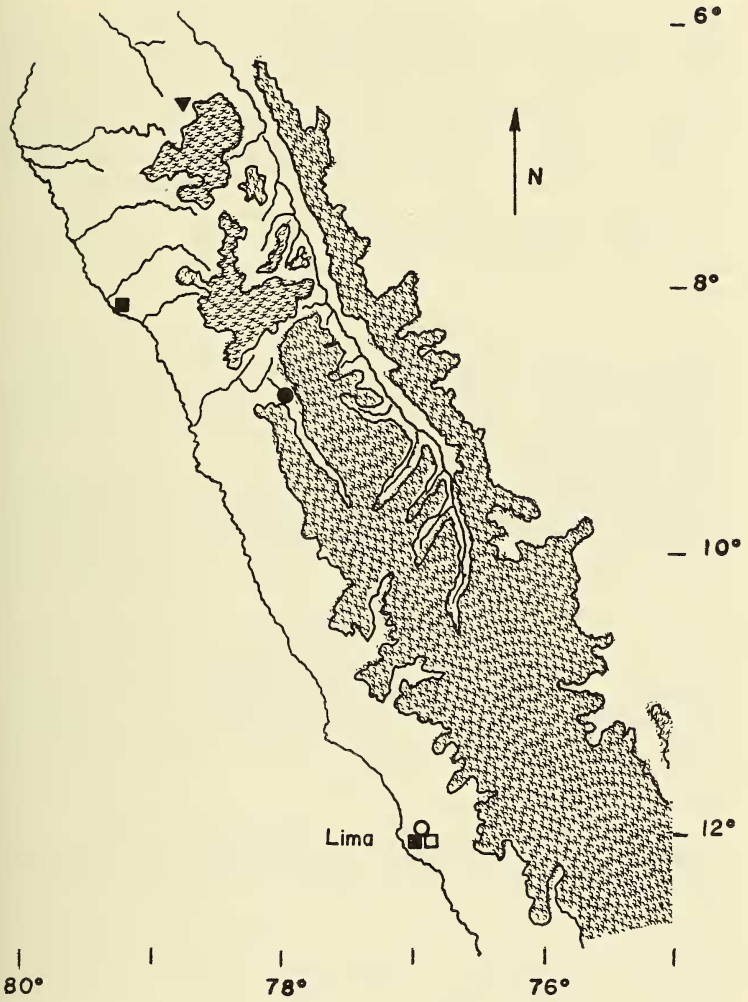

FIG. 3. Distribution of Peruvian members of *tesselatus* species group. *L. rufidorsus* is intermediate between this group and *albifrons* group. Open circle, *rubrolineatus*; solid circle, *tricolor*; open square, *tesselatus*; solid square, *rufidorsus*; triangle, *teaguei*; shaded area, altitude greater than 2500 m.

be wider. The black rostral mustache of the USNM paratype is proportionately larger than that of the holotype and continuous across the infranasal with the dorsolateral stripe.

Discussion: Members of the *tesselatus* species group share: a supra-

labial border of rostral, infranasal, anterior supralabial, ocular and posterior supralabial, an enlarged supraocular in broad contact with the anterior supralabial thereby preventing ocular-nasal contact, and ten scale rows around the middle of the tail. Currently five species comprise this group: *L. rubrolineatus*, *L. teaguei*, *L. tenellus*, *L. tesselatus*, and *L. tricolor*. *L. tenellus* is widespread in northern South America (Figure 2), whereas the other four are confined to western Peru (Figure 3) and generally to the immediate vicinity of their type localities.

L. rufidorsus (Taylor, 1940:532) is not included in the *tesselatus* group because the holotype has an asymmetry of left and right supraoculars, and the second known specimen (Schmidt and Walker, 1943) possesses ocular-nasal contact, albeit narrow (Orejas-Miranda, 1964). However, the enlargement of the supraocular reduces the amount of ocular-nasal contact in *rufidorsus* and suggests that *rufidorsus* is intermediate between the *albifrons* and *tesselatus* groups. These two groups are similar in most characteristics but differ primarily by the broad ocular-nasal contact of the *albifrons* group.

L. rufidorsus and three of the *tesselatus* group species (*rubrolineatus*, *teaguei* and *tricolor*) share a striped pattern with a red dorsal stripe. The reddish stripe occurs only in these Peruvian species. Because the four species are related, their sharing of a similar color pattern is not unexpected. But why is the dorsum red, when red does not appear in any other leptotyphlopid groups, and why is this color pattern restricted to western Peru? The three colors, red, cream and black, occur either together or in combinations of two in many fossorial snakes; however, these colors are usually in transverse bands or blotches and are considered to be aposematic or mimetic patterns. The pattern of these leptotyphlopids is possibly mimetic. R. Thomas (*in litt.*) suggested that some *Leptotyphlops* bear a strong resemblance to small millipeds; therefore mimicry is a possibility.

If the *tesselatus* members prove to be polymorphic, *teaguei* may be the red-striped morph of *tenellus*. In spite of the strong similarity in color pattern to *teaguei*, *tricolor* has approximately 60 to 70 more middorsal scales, a number which does not support a close relationship. Likewise *tricolor* has 40 to 50 more middorsals than either *rufidorsus* or *tesselatus* and is probably not closely related to them. *L. tricolor* is a distinctive new leptotyphlopid in the Peruvian fauna.

Key to Species of the *TESSELATUS* Group

1. A bicolor pattern of cream white and dark brown; dorsal and ventral coloration pattern identical 2
   A tricolor pattern of cream white, brick red and black; dorsal and ventral coloration dissimilar 3
2. Middorsal scales more than 250; generally small, body diameter 55 times or more into total body length ..... *tesselatus*
   Middorsal scales less than 250; generally large, body diameter less than 49 times into total body length ..... *tenellus*

3. Body bicolor, a black venter bordered above by a red dorsum; cream white areas confined to head and tail ..... *rubrolineatus*
   Body tricolor, a black venter separated from a red dorsum by a cream white lateral, and a black dorsolateral stripe on each side .. 4
4. Middorsal scales less than 250; five black dorsal stripes, the middle three thin and enclosed within dorsal red stripe; throat completely black ..... *teaguei*
   Middorsal scales more than 300; dorsal red stripe bordered by dorsolateral black stripe, three middle stripes absent; throat cream white with a midventral black stripe ..... *tricolor*

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